STATE OF ALASKA

Jay S. Hammond, Governor

Annual Performance Report for

INVENTORY AND CATALOGING OF KENAI PENINSULA, AND COOK INLET DRAINAGES AND FISH STOCKS

by

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DIVISION OF SPORT FISH

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RESEARCH PROJECT SEGMENT

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Cooperators: Joe Wallis and Steven Hammarstrom

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ABSTRACT

Relative growth and survival rates, determined by fall gill-netting, are presented for rainbow trout, Salmo gairdneri Richardson, coho salmon, Oncorhynchus kisutch (Walbaum) and Dolly Varden, Salvelinus malma (Walbaum) captured in managed area lakes. Pertinent historical data regarding stocking, size, time, densities and catch rates are examined for various stocked lakes.

Creel census activities on 64.4 kilometers (40 miles) of the Kenai River resulted in an estimated harvest of 49,099 fish in 97,010 man-days of effort. Harvest estimates for coho salmon, sockeye salmon, Oncorhynchus nerka (Walbaum), pink salmon, Oncorhynchus gorbuscha (Walbaum), rainbow trout and Dolly Varden are presented. Angler effort during June and July was directed primarily toward chinook salmon, Oncorhynchus tshawytscha (Walbaum), although other species are harvested incidentally. After August, effort was directed to coho salmon.

It was estimated that anglers fished a total of 16,964 man-days on Anchor River during the period July 13 through November 1, 1981. The harvest was estimated to be 12,600 Dolly Varden, 2,643 coho salmon, 571 steelhead trout and 175 pink salmon.

Life history data were obtained for juvenile Dolly Varden, coho salmon and chinook salmon captured in trapping facilities throughout the Anchor River system. Peak migration of Dolly Varden smolts was the last week in May and the first week in June, and smolts averaged 128 millimeters in length. Coho salmon smolt migration peaked in early June and smolts averaged 103 millimeters in length. Chinook salmon smolts migrated from late May through July with the peak migration in early July; smolts averaged 95 millimeters in length.

KEY WORDS

Rainbow trout, coho salmon, Dolly Varden, Kenai Peninsula, Cook Inlet Drainages, environmental characteristics, egg sources and stocks, public access.

BACKGROUND

Maps showing the location of the study area are presented in Figures 1 and 2, and a list of species of fish is presented in Table 1.

Stocked Lake Evaluation

Since statehood, an ongoing program to provide angling opportunities in easily accessible lake waters has utilized artificially reared or transplanted fish. Survey data have been analyzed with regard to: need for additional angling opportunity; potential of a given water to sustain desired species; stock status, condition and composition of existing populations; and requirements for rehabilitation or enhancement.

Historically, rainbow trout and coho salmon have been predominant species used for stocking. Sockeye salmon and Arctic grayling have also been used when these species are available.

During the last few years, the state has been attempting to establish its own native brood stock of rainbow trout. Fish from the Swanson River were selected after testing against two other stocks. There have been difficulties with the program and, as a result, rainbow trout have not been available for stocking. As a result, coho salmon have been substituted in a number of lakes. Only one lake was stocked with rainbow trout in 1978, none in 1979 and two in 1980. In 1981, however, enough fish were available to stock three lakes.

Stocked populations are sampled each fall and the data obtained are used to determine relative survival, growth rate and future stocking densities. In addition, data gathered are forwarded to researchers in the Matanuska Valley where work evaluating native Alaskan rainbow trout brood stock is being conducted.

Skilak Lake Rainbow Trout

Since 1976, mild winter conditions have prevailed on the Kenai Peninsula. The Kenai River, at both its inlet to and outlet from Skilak Lake, has attracted more and more anglers in search of large rainbow trout. Fish up to 8.2 kg (18 lbs) have been reported. As this fishery became more popular, the public became more concerned that the population was being overharvested. The Department of Fish and Game conducted a creel census in 1979 (Wallis and Hammarstrom, 1980) and determined that neither harvest nor effort warranted additional census activities.

The Board of Fisheries decided to restrict this fishery by making the Kenai River, from its confluence with Moose River upstream to Kenai Lake, a single hook artificial lure area from January 1 through May 31.

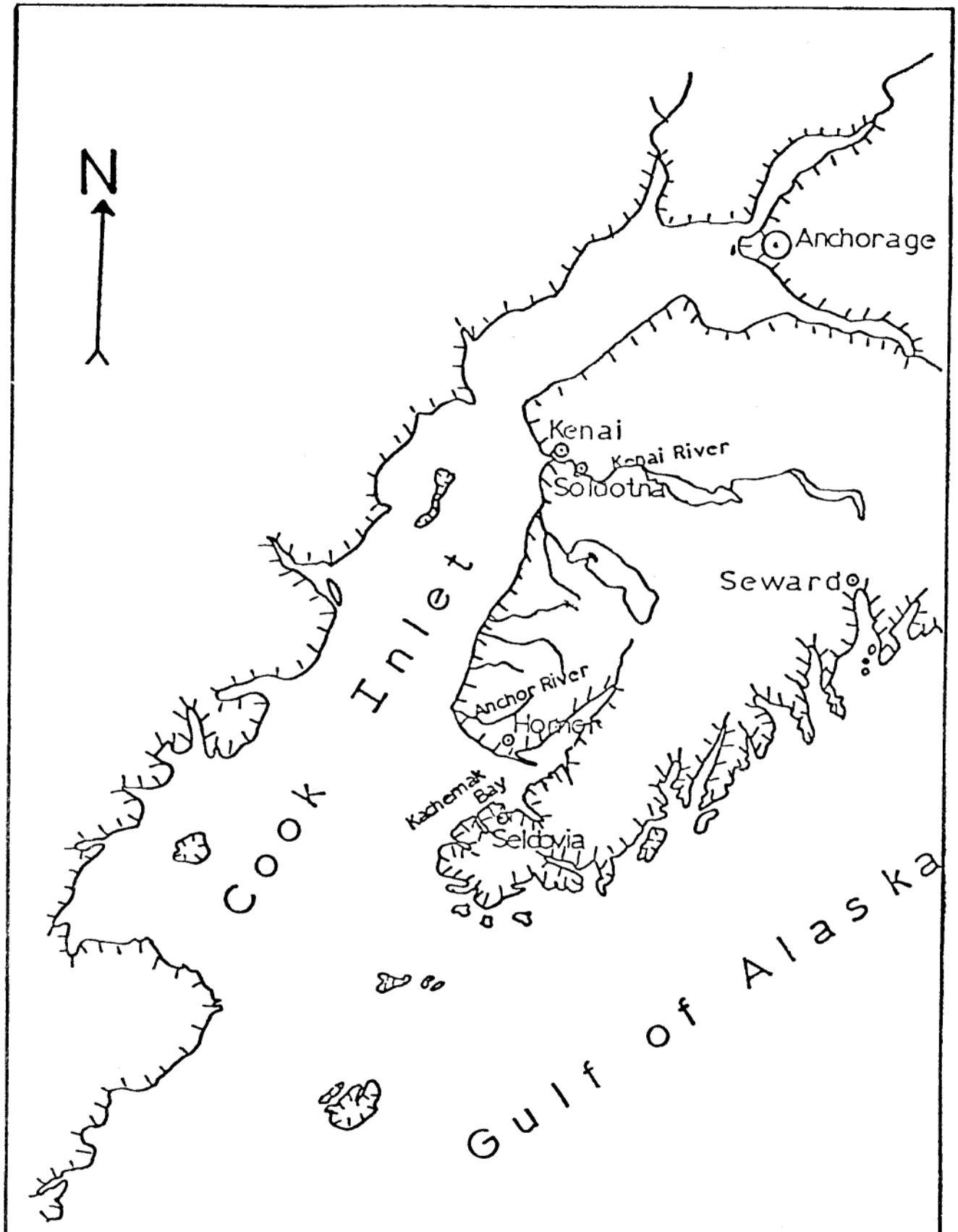

Figure 1. Vicinity Map Showing Location of the Study Area.

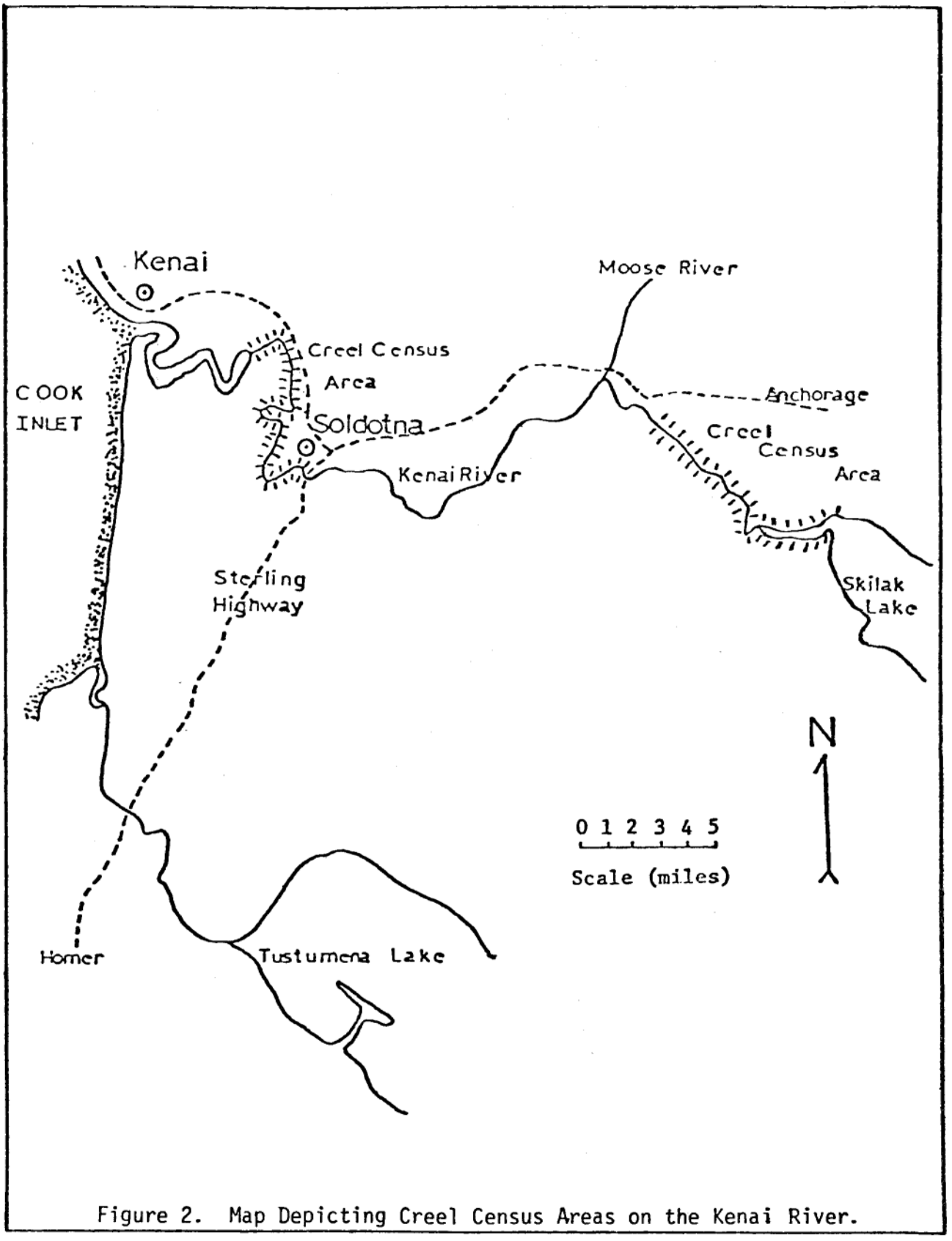

Figure 2. Map Depicting Creel Census Areas on the Kenai River.

Table 1. List of Common Names, Scientific Names and Abbreviations.

Common Name	Scientific Name and Author	Abbreviation
Pink Salmon	Oncorhynchus gorbuscha (Walbaum)	PS
Chinook Salmon	Oncorhynchus tshawytscha (Walbaum)	KS
Chum Salmon	Oncorhynchus keta (Walbaum)	CS
Coho Salmon	Oncorhynchus kisutch (Walbaum)	SS
Sockeye Salmon	Oncorhynchus nerka (Walbaum)	RS
Dolly Varden	Salvelinus malma (Walbaum)	DV
Lake Trout	Salvelinus namaycush (Walbaum)	LT
Rainbow Trout	Salmo gairdneri Richardson	RT
Steelhead Trout	Salmo gairdneri Richardson	SH
Arctic Grayling	Thymallus arcticus (Pallas)	GR
Round Whitefish	Prosopivm cylindraceum (Pallus)	RW
Threespine Stickleback	Gasteroseus aculeatus (Linneaus)	TST

An attempt was made in 1980 to capture and tag rainbow trout at the outlet of Skilak Lake for a population estimate, however, insufficient numbers were collected to obtain a statistically valid estimate. With the use of an electroshocking boat described by Hammarstrom (1975), another attempt to capture fish in known spawning areas was made during the time fish should have been spawning. Few rainbow trout were captured, but the ones taken were in spawning condition.

Kenai River Creel Census

The creel census on the Kenai River was initiated in 1974. Initially, the target species was chinook salmon; however, information gathered the first year demonstrated that anglers shift their emphasis from chinook salmon to coho salmon after the chinook salmon season closes (July 31).

The fishing techniques also change from those primarily of a drift fishery to those of a stationary bait or casting fishery. Although most anglers still use boats, they usually run to a favorite spot, anchor and either fish roe or lures. In 1981, there were also significant numbers of anglers who used a relatively new trolling technique termed "tad-pollying". Fishing continues through September unless poor weather or high water levels prevail.

The coho salmon run into the Kenai River is comprised of two segments, early and late. The early run enters the stream in late July, peaks in early August and is present until late August. The late run usually enters in late August and is present until freeze-up, with the greatest fishing success occurring in mid-September.

Prior to 1978, both runs were harvested commercially, primarily by the set net fishery occurring on the eastern shores of Cook Inlet (statistical areas 244-20, 30, 40). A decision by the Board of Fisheries in 1978 set the commercial closing date in this part of the Cook Inlet at August 15.

In 1978, legislation was passed giving subsistence priority use of fishery resources. Prior to 1978, a small subsistence fishery had taken place along the east side of Cook Inlet. The fishery grew to nearly 600 household permits in 1980. In spring 1981 the Board of Fisheries closed the subsistence fishery. However, a court decision overruled the Board and the Department was ordered to conduct a fishery in fall 1981.

Anchor River Creel Census

Anchor River has long been recognized as one of the most popular sport fishing streams on the Kenai Peninsula. The river supports good population of Dolly Varden, chinook and coho salmon. It also has the largest steelhead trout populations of the five Kenai Peninsula streams which produce this species.

Observations indicated a great increase in angler effort and harvest on the river and, during the period 1978-81, a creel census of the summer-fall sport fishery has been conducted to obtain data on harvest and population levels of Dolly Varden, coho salmon and steelhead trout.

Anchor River Life History Studies

During the course of an ongoing life history study of steelhead trout in Anchor River, juvenile salmonids were captured in various locations in the watershed. Fish of all species were captured, thereby providing an opportunity to obtain basic life history data for other species in addition to steelhead trout. These data will provide a better understanding of the stocks of fish and ultimately lead to better management techniques.

RECOMMENDATIONS

1. Adult Arctic grayling should be transported from Bench Lake to Seldovia Lake in an attempt to establish a self-sustaining population.

2. Added emphasis should be placed upon collection of life history data for coho and chinook salmon and Dolly Varden, and defining population characteristics of Dolly Varden in the Anchor River.

OBJECTIVES

1. To determine the environmental characteristics of the existing recreational fishery waters of the job area and to obtain estimates of existing and/or potential angler use and sport fish harvest.

2. To evaluate application of fishery restoration measures and availability of sport fish egg sources.

3. To assist as required in the investigation of public access status to the area's fishing waters and to make specific recommendations for segregation of public fishing access sites.

4. To investigate, evaluate and develop plans for enhancement of anadromous and resident fish stocks.

5. To provide recommendations for the management of sport fish resources in these waters.

TECHNIQUES USED

Stocked Lake Evaluation and Lake Survey

The techniques for evaluating the stocked lakes were the same as those described by the Lake and Stream Manual, ADF&G (1971), Engel (1973) and Hammarstrom (1974).

Skilak Lake Rainbow Trout

During the spring of 1981, repetitive trips were made to the outlet of Skilak Lake in an attempt to capture spawning rainbow trout. In the past, seine nets have failed to produce catches sufficient to conduct population

estimates. The electroshocking boat was successful in capturing both rainbow trout and round whitefish, Prosopium cylindraceum (Pallas).

Kenai River Creel Census

The creel census employed on the Kenai River was based on the techniques described by Neuhold and Lu (1957) and described in detail by Hammarstrom (1977).

Effort estimates were based on two randomly selected instantaneous angler counts per day. Every weekend/holiday and 3 of 5 weekdays were sampled. Because of changing daylight hours, the fishing day ranged from 20 hours to 12 hours as follows: June and July, 20 hours; August, 16 hours; September, 12 hours. During two interview periods, the following information was collected: hours fished; catch by number and species; whether guided or unguided; and specific biological data from chinook salmon, coho salmon and large rainbow trout.

The Kenai River coho salmon run is comprised of two distinct segments, termed early run and late run. Certain Alaska Board of Fisheries' policies pertain to these run segments; therefore, effort and harvest were calculated separately for early run and late run fish in upstream and downstream sections of the river. Previous unpublished data have shown the uncensused section of the river accounts for 9.1%, as much angling effort as the two census areas. In 1981, effort in the uncensused area increased to 12.6% and, thus, estimates for the two census areas were combined and increased by 12.6% to achieve total estimates for the river. The separation date between early and late run was determined by analyzing catch rates and size of fish captured, then adjusted to the closest weekly period.

Anchor River Creel Census

The Anchor River creel census was conducted during the period July 13 through November 1, 1981. Methods employed were described in detail by Wallis and Hammarstrom (1979).

Biological data (fork length, sex and scales) were collected from samples of adult coho salmon. Scales were mounted on gummed cards and pressed on acetate sheets, then were read on a microfiche viewer.

Anchor River Life History Studies

Juvenile chinook and coho salmon and Dolly Varden were captured in an "inclined plane" downstream migrant trap, a fyke net and several minnow traps. Samples of fish were measured, weighed and scales removed. Scales were mounted on glass slides for later analysis.

FINDINGS

Stocked Lake Evaluation

Currently there are 16 area lakes being managed for recreational fishing. Five are stocked with rainbow trout: Carter, Jerome, Rainbow, Sport and Vagt Lakes. Of these, only Sport Lake was sampled in 1981. Rainbow and Jerome Lakes were stocked in 1981 and thus the fish were considered too small to sample with variable mesh gill nets. Carter and Vagt Lakes are remote lakes and are not sampled on a regular basis. Eleven of the area lakes are stocked with coho salmon (Table 2), five of which were stocked in 1981. They were: Arc, Centennial, Engineer, Rogue and Sunken Island Lakes. Most lakes stocked with coho salmon support winter fisheries. Initial reports from anglers indicated excellent fisheries on Cabin Lake, Johnson Lake and Sunken Island Lake. This corroborates what was suggested by the relative high catch per hour figures for those three lakes during the fall gill net sampling.

One lake, Scout Lake was stocked in 1981 with chinook salmon as an experiment to see if the species could support a winter fishery. This lake was one of several in an overall program to evaluate the potential of chinook salmon for supporting fisheries in landlocked lakes throughout southcentral Alaska. Initial indications are encouraging.

Soon after Scout Lake froze over, anglers started fishing. The chinook salmon were approximately 180 mm (7 in) in size and were readily taken on hook and line. Researchers in the Matanuska Valley reported similar results. Scout Lake was not included on the fall gill netting schedule as it was felt these fish would be too small to be readily captured by the nets. Judging from angler reports and personal observation, apparent survival through the growing season is excellent and the growth rate is acceptable.

Pertinent historical data regarding stocking of area lakes are presented in Table 2. The summarized results of gill net sampling in 1981 is presented in Table 3.

Kenai River Creel Census

The creel census on the Kenai River commenced June 1 and was continuous through September 30. Through July 26 (the stream was closed to chinook salmon fishing by emergency order 5 days early), the principal species harvested was chinook salmon. Other species harvested, (Dolly Varden, rainbow trout, sockeye, coho and pink salmon) were taken incidental to chinook salmon. Data regarding chinook salmon and the associated fishery are presented in the G-II-L Report of Progress, Hammarstrom (1982).

When the chinook salmon season normally closes on July 31, emphasis shifts to coho salmon. Anglers that had drift-fished the day before would set an anchor in a quiet area along the bank and either fish with bait, usually salmon roe, or cast for coho or pink salmon. Being of an "even" year cycle in the Kenai River, few pink salmon were available in 1981.

Table 2. Stocking Summary of Kenai Peninsula Lakes Stocked Since 1978.

Lake	Date Stocked	Species	Origin	Fish/kg (lb)	Fish/Hectare (acre)	Total Stocked
Arc	6/15/78	SS	Seward, AK	652(295)	630(255)	4,000
	5/21/81	SS	Seward, AK	684(310)	473(191)	3,000
Cabin	7/24/79	SS	Seward, AK	267(121)	650(263)	15,000
Carter	7/30/80	RB	Talarik Cr., AK	864(376)	494(200)	9,600
Centennial	6/08/79	SS	Seward, AK	785(357)	610(244)	6,100
	5/21/81	SS	Seward, AK	684(310)	600(240)	6,000
Engineer	6/08/79	SS	Seward, AK	785(357)	370(150)	34,250
	5/21/81	SS	Seward, AK	684(310)	486(197)	45,000
Jerome	9/24/81	RB	Swanson River, AK	567(257)	454(184)	3,000
Johnson	7/24/79	SS	Seward, AK	267(121)	580(235)	20,000
Longmore	8/16/78	SS	Seward, AK	323(147)	283(115)	19,700
Portage	7/24/79	SS	Seward, AK	267(121)	449(182)	5,000
Rainbow	9/24/81	RB	Swanson River, AK	567(257)	495(200)	3,000
Rogue	5/21/81	SS	Seward, AK	684(310)	740(300)	1,500
Scout	6/15/78	SS	Seward, AK	652(285)	494(200)	19,000
	5/27/81	KS	Ship Cr., AK	72(33)	312(126)	12,000

Table 2. (Cont'd) Stocking Summary of Kenai Peninsula Lakes Stocked Since 1978.

Lake	Date Stocked	Species	Origin	Fish/kg (lb)	Fish/Hectare (acre)	Total Stocked
Sport	9/15/78	RB	Talarik Cr., AK	319(145)	293(119)	8,550
	9/24/81	RB	Swanson River, AK	567(257)	240(98)	7,000
Sunken Island	6/08/79	SS	Seward, AK	785(357)	534(216)	30,250
	5/21/81	SS	Seward, AK	684(310)	530(214)	30,000
Upper Jean	6/08/79	SS	Seward, AK	785(357)	486(197)	9,060
Vagt	7/30/80	RB	Talarik Cr., AK	864(376)	495(200)	8,600

Table 3. Summary of Gill Net Results from Kenai Peninsula Lakes Sampled in 1981.

Lake	Species	Number Caught	Year Planted	Fork Length (mm) Range	Fork Length (mm) Mean	Weight (kg) Mean	Catch/Hour
Arc	SS	7	1978	300-343	316.3	0.358	0.30
	SS	9	1981	94-149	112.0	0.013	0.50
Cabin	SS	33	1979	185-243	212.0	0.100	1.55
Centennial	SS	9	1979	213-225	219.0	0.109	0.39
	SS	31	1981	105-125	113.2	0.018	1.29
Engineer	DV	1	?	420	420	0.816	0.02
	SS	43	1979	203-344	296.3	0.295	0.84
	SS	101	1981	...	...	0.018	1.98
Upper Jean	SS	19	1979	205-405	242.0	0.168	0.73
Johnson	SS	113	1979	210-350	242.8	0.163	2.46
Longmore	SS	13	1978	278-450	393.5	0.821	0.31
Portage	SS	23	1979	182-275	232.0	0.145	0.96
Sport	RB	5	1978	350-475	418.0	1.043	0.12
Sunken Island	SS	35	1979	185-396	238.8	0.168	1.59
	SS	49	1981	82-112	140.2	0.014	2.23

The coho salmon return to the Kenai River is comprised of two segments termed early run and late run. Early run fish are available from late July through late August. In 1981, the first coho salmon was reported July 19 and a few were reported each day until July 27 when catch rates began rising steadily in the downstream section (Beaver Creek to the Soldotna Bridge). The early run peaked in this section about August 10 and was considered present until August 31 (Figure 3). The upstream section displayed similar timing; the early run began to show increased harvest rates the first week of August, peaked about August 12, and was considered present until August 31 (Figure 4).

The late run became available in both sections about September 1. Because of the strong return, the early run and the "seasonal use" gill net fishing on the late run, the date is somewhat artificial. Undoubtedly there is an overlap between the two runs but, during years when both runs are strong, the timing between the end of the early run and beginning of the late run is far less pronounced than during years of normal escapement. The late run was considered available until September 30 when the census terminated.

Fish are taken into October, however cold temperatures, inclement weather and reduced flow in the Kenai River reduces the effort to a point which makes it unjustifiable to continue the creel census. For those anglers who do venture out, fishing can be quite good but the total harvest is felt to be insignificant after September 30.

The 1981 early run was considered to be quite strong. Coho salmon catch per hour averaged 0.129 (Table 4), which is approximately 20% greater than the 1975-1980 mean. Since 1975, it has taken an average of 9.3 man-hours to capture one early run coho salmon. In 1981 it took only 7.8 man-hours. Total recreational harvest was estimated at 14,682 fish and total effort at 25,670 man-days. Total commercial harvest from the set net along the eastern shore of Cook Inlet was 38,148. The commercial harvest through August 15 was 31% greater than the 1975-1980 mean coho salmon harvest through August 15. The early run recreational harvest was 78% greater than the 1975-1980 early run mean.

The late run was also considered to be strong. Catch per hour was reduced slightly from the 1976-1980 mean, but some of that reduction can be explained by the court-ordered "personal use" gill net fishery that was held in late August and September. During that fishery, held from August 17 through September 22, a total of 12,100 coho salmon were harvested from the east side beaches of Cook Inlet. Had these fish been allowed into the recreational fishery, the catch per hour would have been greater than the 0.121. How much greater is speculative, but the 0.121 catch per hour is not representative of the total return to the Kenai River. Total recreational harvest was 6,370 coho salmon by 13,100 man-days of effort. Both figures are very close to the 1976-1980 mean (Table 4).

Fish from the early run weighed more than early run fish in 1980 (Hammarstrom, 1981); 4.0 kg in 1981 as opposed to 3.5 kg in 1980. Mean lengths, however, were similar. Late run fish were also heavier than in 1980, 4.7 kg and 4.4 kg, respectively, and mean lengths were similar. A length/weight relationship is depicted in Figure 5.

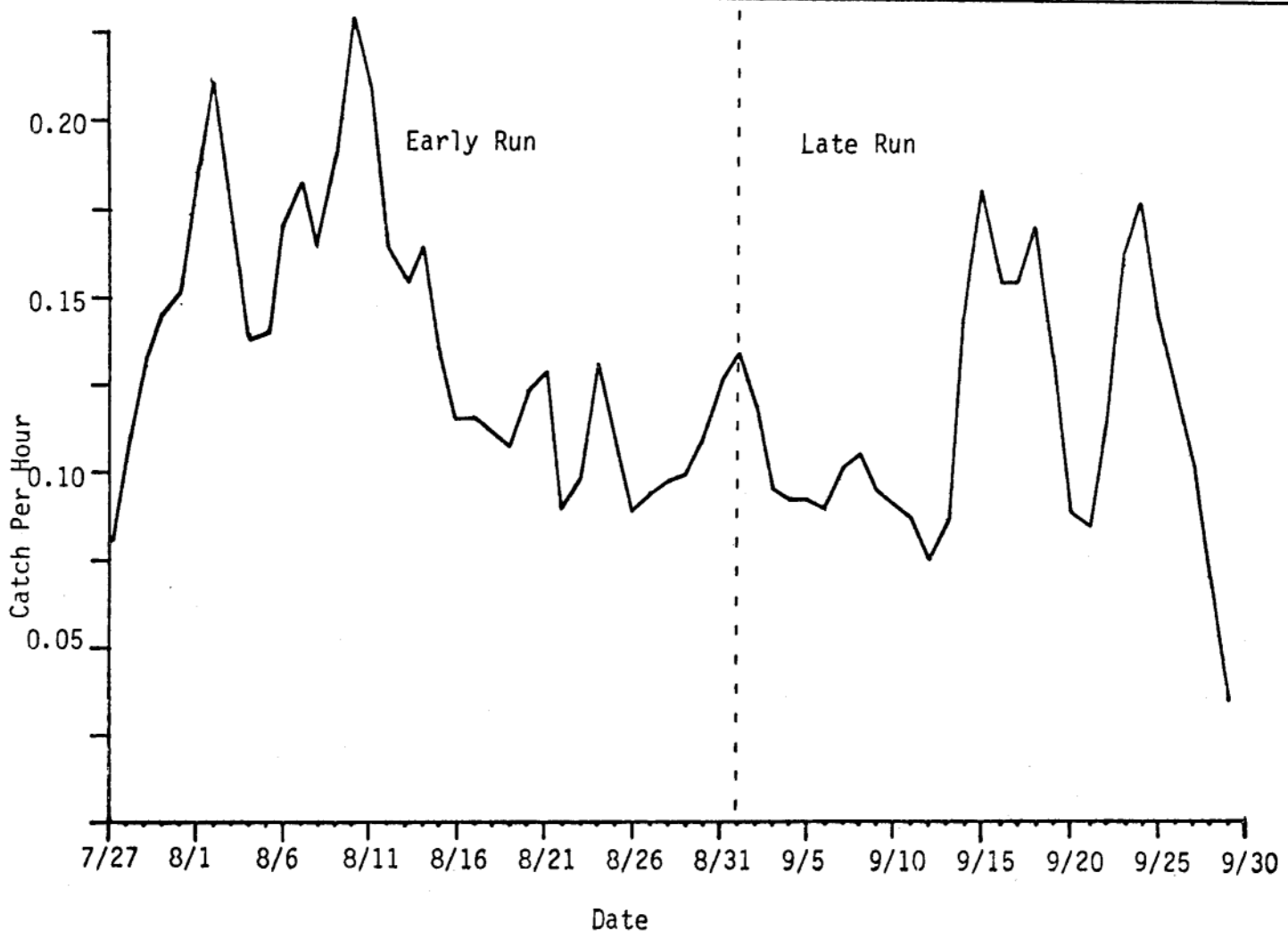

Figure 3. Catch Per Hour by Date for Kenai River Coho Salmon Fishery, Downstream Section, 1981. Graph smoothed by a+2b+c

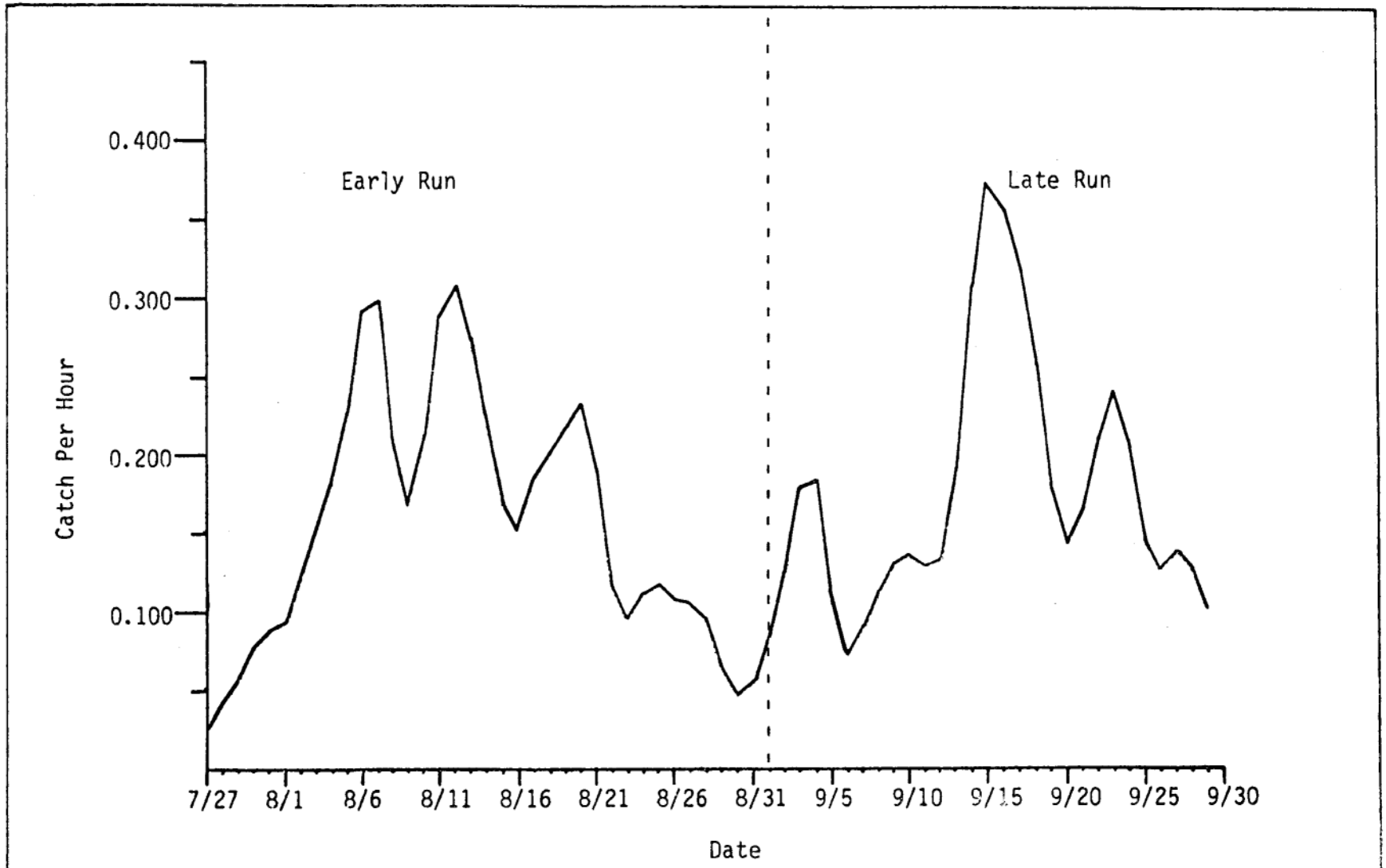

Figure 4. Catch Per Hour by Date for Kenai River Coho Salmon Fishery, Upstream Section, 1981. Graph smoothed by a+2b+c.

Table 4. Summary of Kenai River Coho Salmon Sport Harvest and Effort, 1975-1981.

Year	Early Run			Late Run			Total	
	Harvest	Man-Days of Effort	Catch/hour	Harvest	Man-Days of Effort	Catch/hour	Harvest	Effort
1975	5,715	9,725	0.091	.....Not Censused.....				
1976	6,365	18,620	0.085	7,445	17,430	0.122	13,810	36,050
1977	6,780	12,520	0.123	3,280	6,630	0.105	10,060	19,150
1978	5,255	19,965	0.058	6,360	18,140	0.100	11,585	38,105
1979	8,795	15,700	0.101	5,685	12,325	0.123	14,480	28,025
1980	15,796	22,095	0.184	9,459	10,740	0.251	25,255	32,835
1975-80 Mean	8,113	16,438	0.107	6,449	13,053	0.134	15,038	30,833
1981	14,682	25,670	0.129	6,370	13,100	0.121	21,052	38,770

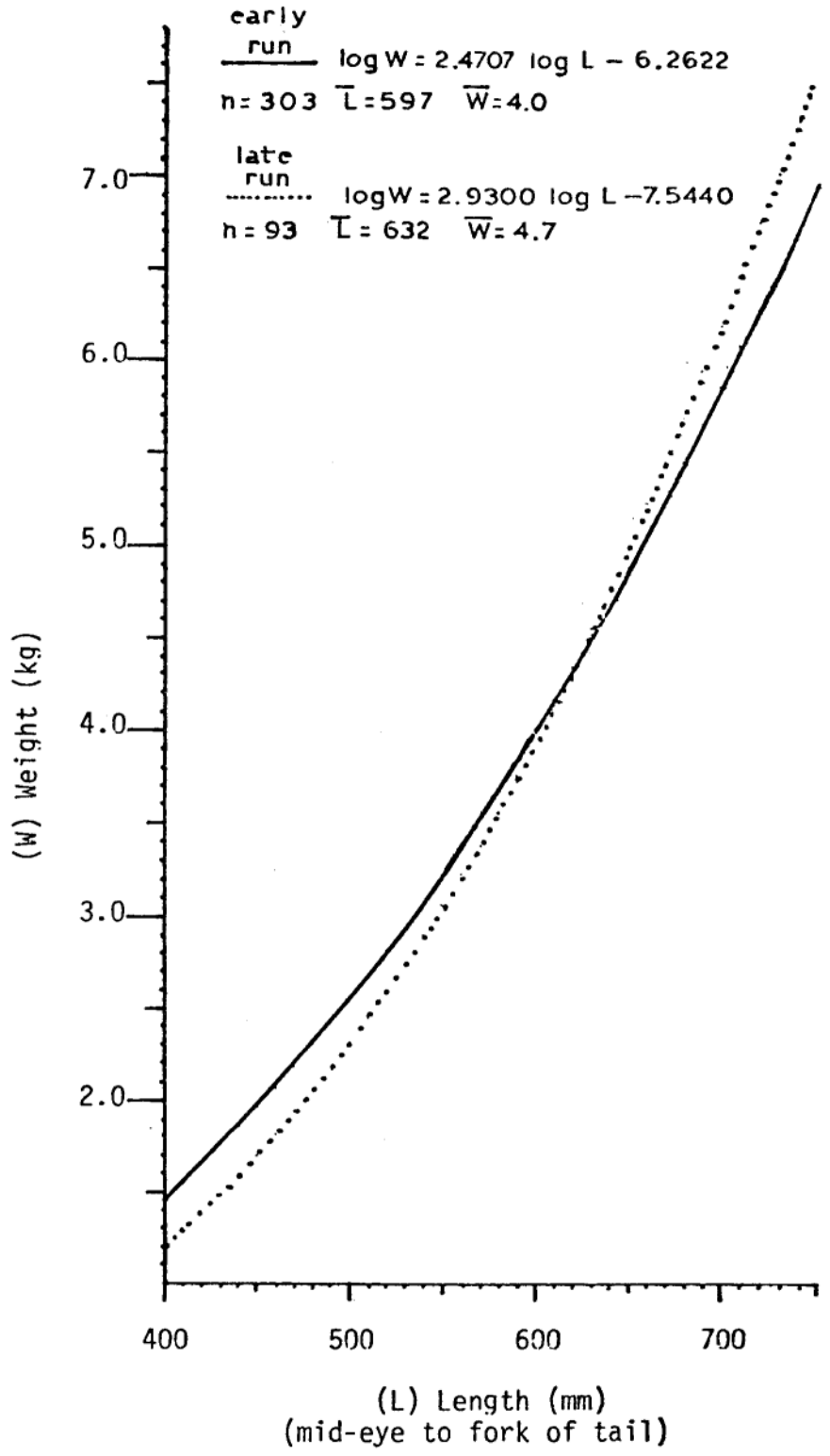

Figure 5. Length-Weight Relationship for Coho Salmon Captured in the Recreational Fishery on the Kenai River, 1981.

Most of the species of fish other than chinook salmon in the Kenai River are harvested incidentally while fishing for chinook salmon. Data regarding other species are presented in Table 5 and a historical summary of harvest is presented in Table 6. Both the rainbow trout and Dolly Varden harvests were higher than 1980. In fact, total harvest was the highest recorded since 1976.

Although the rainbow trout harvest increased from last year, the Board of Fisheries felt that because of a reported absence of large fish, further restrictions were necessary to protect the spawning population. In 1982, the Kenai River will be closed to rainbow trout fishing from January 1 through June 14 from Kenai Lake downstream to Cook Inlet.

Anchor River Creel Census

A creel census of the summer-fall fishery was started on July 13 and terminated on November 1, 1981. A summary of estimated angler effort and harvest is presented in Table 7. A total of 4,787 anglers were interviewed and completed anglers fished an average of 3.05 hours per day. Total angling effort during the period was 16,964 man-days.

A summary of creel census data since 1954 for the summer-fall fishery is presented in Table 8. Total angler effort increased over that observed in 1980, but did not reach the level observed in the peak years of 1977-1979.

Two hundred twelve Dolly Varden were tagged with serially-numbered Floy anchor tags during the period July 17 and September 22, inclusive, in an attempt to make a population estimate of Dolly Varden in the Anchor River. However, only six tags were recovered and an estimate of total population was not possible.

Scales from 104 coho salmon caught by anglers were collected and used for age determination. The length frequency of the sample is listed in Table 9 by age classification and sex. In the sample, 14.4% were Age 1.1 and 85.6% were Age 2.1; the ratio of males to females was 1:0.76.

Life History Studies

Juvenile salmonids were captured in various trapping facilities during the period May 8 through October 1, 1981 as part of a steelhead trout life history study (Wallis and Balland, 1982). Coho salmon, chinook salmon and Dolly Varden juveniles were also captured in the traps and provide some information on time of migration and size at migration. Numbers of juveniles captured at the different locations are listed in Table 10, and location of the trap sites is shown in Figure 6.

In Figure 7, the approximate times of migration for smolt-sized juveniles of the three species are illustrated. The inclined plane trap in the South Fork of Anchor River was not fished during the weeks ending July 5 and July 12 due to low water conditions. The fyke net in the North Fork of Anchor River was fished during this period and these data are included to fill a gap in the data and provide a comparison.

Table 5. Harvest and Effort as Determined by Creel Census by Month, by Species, for the Kenai River, 1981.

Month	Effort Man-Days	Chinook Salmon	Sockeye Salmon	Pink Salmon	Coho Salmon	Rainbow Trout	Dolly Varden	Total Harvest	Total Catch/Hour
				Downstream Section					
June & July	38,878	7,943	457	...	76	343	1,926	10,745	0.060
August	11,938	...	...	...	8,081	138	178	8,397	0.147
September	5,655	...	...	...	2,818	85	24	2,927	0.118
Total	56,471	7,943	457	...	10,975	566	2,128	22,069	0.084
				Midstream Section					
June & July	7,312	1,240	304	5	26	226	706	2,507	0.074
August	3,152	...	93	5	1,778	124	570	2,570	0.196
September	1,610	...	2	1	781	66	172	1,022	0.163
Total	12,074	1,240	399	11	2,585	416	1,448	6,099	0.113
				Upstream Section					
June & July	12,050	627	1,646	30	105	1,225	2,956	6,589	0.117
August	10,580	...	666	35	4,616	748	3,898	9,963	0.274
September	5,835	...	13	7	2,771	383	1,205	4,379	0.217
Total	28,465	627	2,325	72	7,492	2,356	8,059	20,931	0.185
				Total					
June & July	58,240	9,810	2,407	35	207	1,794	5,588	19,841	0.073
August	25,670	...	759	40	14,475	1,010	4,646	20,930	0.196
September	13,100	...	15	8	6,370	534	1,401	8,328	0.163
Total	97,010	9,810	3,181	83	21,052	3,338	11,635	49,099	0.115

Table 6. Kenai River Historical Sport Harvest (excluding chinook salmon) and Effort Data 1976-1981.

Year	Effort Man-Days	Sockeye* Salmon	Coho Salmon	Pink** Salmon	Rainbow Trout	Dolly Varden	Total Harvest
1976	80,506	719	13,808	21,443	1,797	4,957	42,724
1977	102,203	1,436	10,056	100	2,474	8,058	22,124
1978	118,307	2,180	11,585	17,011	3,118	11,695	45,589
1979	126,585	1,907	14,479	...	3,100	11,764	39,545
1980	103,460	1,862	25,255	7,415	1,541	5,965	42,038
1981	97,010	3,181	21,052	...	3,338	11,635	49,099
Mean	104,678	1,881	16,005	Not Applicable	2,561	9,013	40,187

* Sockeye salmon estimates reflect only the legal boat harvest and do not estimate the shore harvest that occurs outside the creel census area.

** Pink salmon estimates are only valid for the creel census area. A significant harvest occurs downstream from the creel census area.

Table 7. Estimated Sport Fishing Effort and Harvest from Anchor River, by Species and Weekly Intervals, July 13 - November 1, 1981.

Week Ending	Total Effort Angler Hours	Estimated Harvest DV	PS	SS	SH	RT
7/19	2,822	2,327				
7/26	3,354	3,797	21	11		
8/2	3,078	1,346	12	74		
8/9	6,148	626	60	688		
8/16	4,800	156	54	528	11	
8/23	6,115	86	24	819	6	
8/30	4,163	137	4	233	43	
9/6	3,270	322		146	41	
9/13	2,513	244		124	62	4
9/20	1,627	179		11	19	
9/27	2,330	357		6	74	2
10/4	2,516	277			76	
10/11	2,684	649		3	88	
10/18	3,586	890			86	
10/25	1,764	848			46	
11/1	969	359			19	
Total	51,739	12,600	175	2,643	571	6

Table 8. Summary of Creel Census Data from Anchor River for Harvest of Dolly Varden, Coho and Steelhead Trout.

Year	Period Covered In Census	Effort Man-Days	Dolly Varden Harvest	Dolly Varden Total Run	Coho Harvest	Coho Total Run	Steelhead Harvest	Steelhead Total Run
1954	5/29-10/23	3,000	4,000	11,500	395	1,700	247	511
1957	5/1-10/15	5,800	573	7,000	90	801	50	600
1960	5/7-10/2	5,300*	3,300	...	1,000	...	400	...
1968	7/6-10/19	3,045	4,352	...	1,149	...	102	...
1977	5/28-6/19	10,978	NC**	...	NC	...	NC	...
	Bal. of year	20,573	9,222		1,339		1,072	
	Total	31,551	9,222		1,339		1,072	
1978	5/27-6/19	23,748	NC		NC		NC	
	7/15-11/12	20,906	21,141	...	1,433	...	1,462	4,132
	Total	44,654						
1979	4/13-4/30	3,500	5,700	...	0	...	100	...
	5/26-6/18	17,715	NC		NC		NC	
	7/14-11/4	18,267	15,205	...	2,248	5,306	611	
	Total	39,482	20,905		2,248		711	
1980	5/24-6/16	10,109	NC	...	0	...	15	...
	7/1-11/15	15,157	6,904	...	2,645	...	847	2,388
	Total	25,266	6,904		2,645		862	

Table 8. (cont'd) Summary of Creel Census Data from Anchor River for Harvest of Dolly Varden, Coho and Steelhead Trout.

Year	Period Covered In Census	Effort Man-Days	Dolly Varden Harvest	Dolly Varden Total Run	Coho Harvest	Coho Total Run	Steelhead Harvest	Steelhead Total Run
1981	Feb-Mar 1981	2,000	2,000	...	0	...	100	...
	5/30-6/22	12,570	NC	...	0	...	25	...
	7/13-11/1	16,964	12,600	...	2,643	...	571	...
	Total	31,534	14,600		2,643		696	

* Effort incomplete - covers period 5/7-7/14 only.
** NC - Not covered in census.

Table 9. Length Freqency of Coho Salmon from Anchor River, by Sex and Age Classification, 1981.

Age Classification	Males		Females	
	1.1	2.1	1.1	2.1
Length Interval (mm)				
550-574			1	
575-599			1	
600-624	1	4		2
625-649	3	5	1	8
650-674	1	6	2	15
675-699	2	12	1	9
700-724		14		2
725-749	1	9	1	1
750-774		1		
Number	8	51	7	37
Mean	665	690	644	661
S.D.	38.9	39.6	57.8	30.2

Table 10. Numbers of Juvenile Salmonids Captured in Anchor River, 1981.

Location	Method	Dates[1/]	RT/SH	SS	KS	DV
So. Fk. at Forks	Inclined Plane Trap	5/8-9/11	17	510	458	320
So. Fk. at Forks	Minnow Traps	6/2-7/26	71	17	33	29
No. Fk. at Sterling Hwy.	Fyke Net	5/29-7/12	39	609	295	81
No. Fk. at Sterling Hwy.	Minnow Traps	5/5-9/15	261	229	359	126
So. Fk. at No. Fk. Road	Minnow Traps	4/29-6/1	16	3	5	24
Two Moose Creek	Minnow Traps	5/9-10/1	26	21	53	79
Engebretson Creek	Minnow Traps	5/9	0	0	3	3
Telephone Creek	Minnow Traps	5/14-5/20	0	3	0	0
No. Fk. at Chakok East	Minnow Traps	5/5-5/26	37	12	6	28
No. Fk. at Russ. Village	Minnow Traps	5/9-5/14	3	0	0	3
		Total	470	1,404	1,212	693

1/ All traps were operated intermittently.

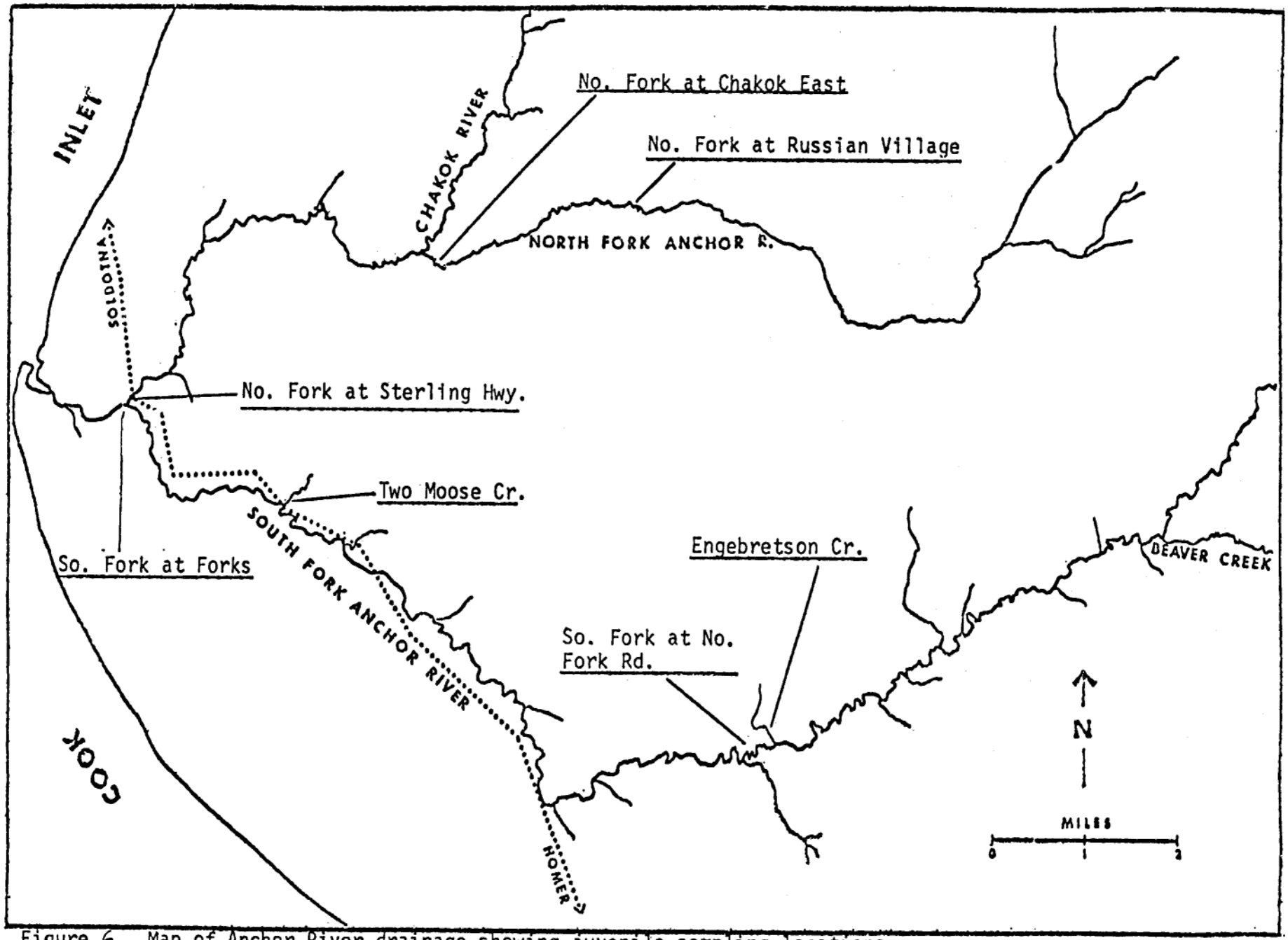

Figure 6. Map of Anchor River drainage showing juvenile sampling locations.

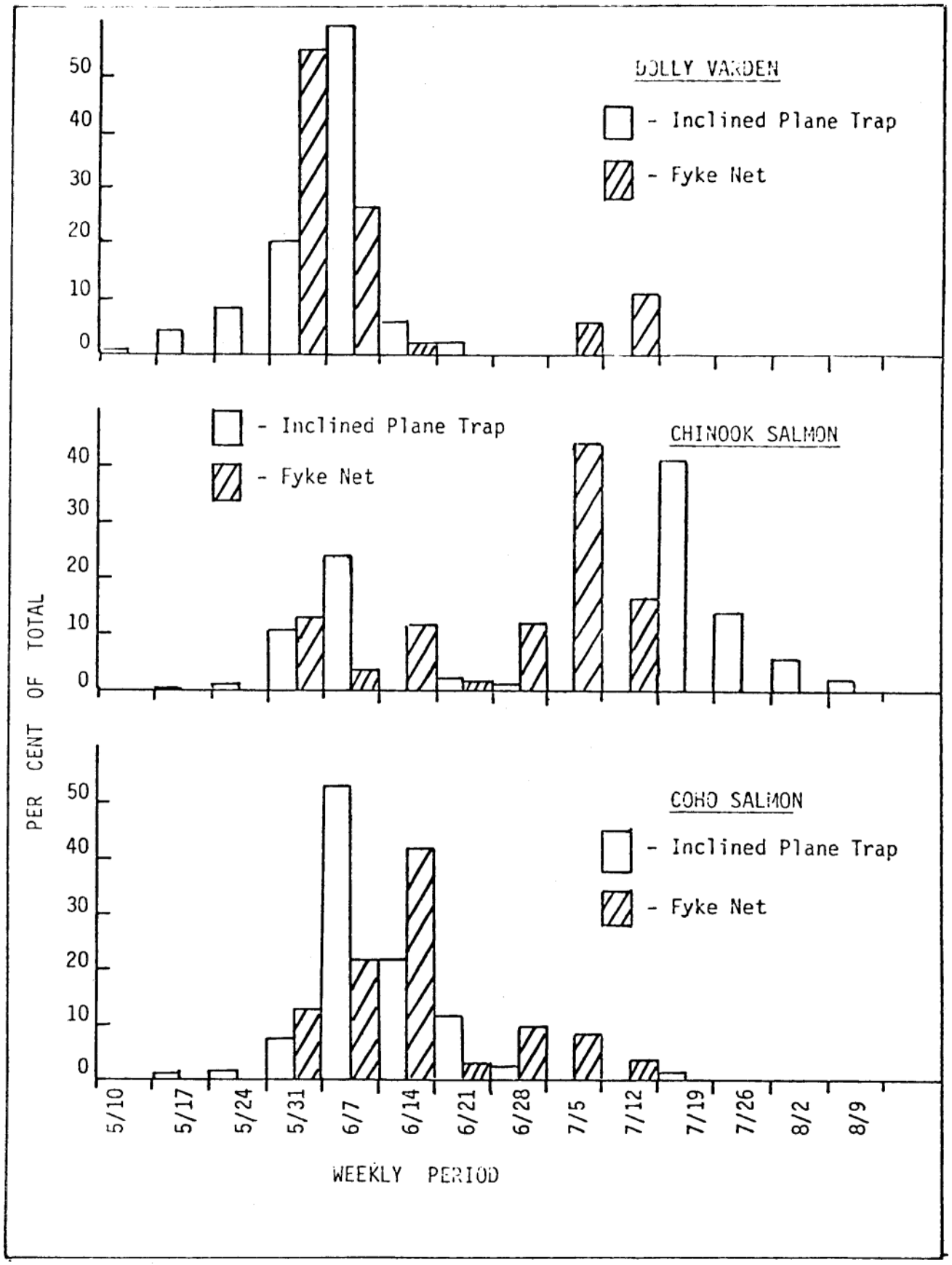

Figure 7. Time of migration of Dolly Varden, coho and chinook salmon smolts in Anchor River determined by catches in an inclined plane trap in the South Fork, and a fyke net in the North Fork of Anchor River.

The peak catch of coho smolts in the inclined plane trap occurred the first week in June and, in the fyke net, the second week in June. Most of the coho migration occurred prior to problems with low water, and the peak catches probably do reflect the peak migration period of early to mid-June.

Peak catch of chinook salmon smolts occurred in the fyke net the first week of July. The apparent peak in catches in the South Fork inclined plane trap may be misleading because the trap was inoperative the previous 2 weeks. Nevertheless, the apparent peak migration period occurred from early to mid-July.

The Dolly Varden smolt migration period was well defined and occurred during the last week of May and first week of June at both trap locations.

Coho salmon smolts were defined as fish larger than 85 mm; this was based upon separation of modal groups in length frequency of fish measured. Fish ranged in length up to 139 mm and mean length of designated smolts was 103 mm.

Chinook salmon smolts were defined as fish larger than 80 mm; this was based upon separation of modal groups as with coho. Fish ranged in length up to 144 mm and the mean length of smolts was 95 mm.

Dolly Varden smolts ranged from 100 mm to 159 mm and the mean length was 128 mm.

Scales were taken from both coho and chinook salmon juveniles. Analysis of scales is still incomplete, but will be completed and incorporated with length and weight data in a more comprehensive study of juvenile growth in a later report.

Kachemak Bay Feeder Chinook Salmon

We have been collecting tagged feeder chinook salmon caught in the Kachemak Bay sport fishery since 1977. With one exception, these have all been reported by one charter operator. In 1981, five additional tagged chinook salmon were turned in to us by the same individual. One fish originated at the National Marine Fisheries Service's Little Port Walter Hatchery in southeast Alaska, a new source for our list (Table 11). The other four fish were of sources where we had previously recovered fish; two from the Robertson Creek Hatchery, one from Nitinat Lake, and one from the Atnarko River Hatchery, all in British Columbia.

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Table 11. List of Tagged Chinook Salmon Caught in Kachemak Bay Sport Fishery 1977-1981.

Date Captured	Length/ Weight	Tag Code	Brood Year	Origin
1977	Lgth.-Weight Unknown	2-3-2	1973	Puntledge River Hatchery, British Columbia; hatchery evaluation.
9/26/78	680 mm/5.9 kg	9-5-7	1975	South Santiam River, Oregon; hatchery experimental.
9/26/78	575 mm/3.7 kg	2-4-11	1975	Nitinat River, British Columbia; wild stock contribution.
9/26/78	570 mm/3.6 kg	2-1-10	1975	Atnarko River, British Columbia; wild stock contribution.
9/30/78	825 mm/6.8 kg	9-5-8	1975	South Santiam River, Oregon; planted in Willamette River at Oregon City.
10/19/78	Lgth. Unknown 2.3 kg	63-16-6	1976	Stagit River, Washington; wild stock contribution.
3/5/79[1/]	505 mm	4-16-16	1976	Crystal Lake Hatchery, Petersburg, Alaska.
5/6/79	Lgth. Unknown 1.6 kg	9-16-30	1976	South Santiam River, Oregon; planted in Willamette River at Oregon City.
9/9/79	Lgth. Unknown 6.8 kg	9-16-30	1976	South Santiam River, Oregon; planted in Willamette River at Oregon City.
10/6/79	760 mm/10 kg	9-5-8	1975	South Santiam River, Oregon; planted in Willamette River at Oregon City.
10/23/79	Lgth.-Weight Unknown	2-16-30	1976	Robertson Creek Hatchery, British Columbia.

Table 11. (cont'd) List of Tagged Chinook Salmon Caught in Kachemak Bay Sport Fishery 1977-1981.

Date Capture	Length/ Weight	Tag Code	Brood Year	Origin
5/23/80	Lgth. Unknown 12.2 kg	2-16-30	1976	Robertson Creek Hatchery, British Columbia.
6/7/80	Lgth.-Weight Unknown	63-16-62	1976	Priest Rapids, Columbia River, Washington.
9/-/80	Lgth.-Weight Unknown	7-12-32	1977	Marion Forks Hatchery, North Santiam River, Oregon.
5/13/81	Lgth. Unknown 6.4 kg	3-16-21	1977	Little Port Walter Hatchery; Alaska; NMFS experimental; Unuk River stock.
5/13/81	Lgth. Unknown 11.3 kg	2-16-28	1976	Nitinat Lake, British Columbia; wild stock contribution.
5/27/81	Lgth.-Weight Unknown	2-16-15	1978	Robertson Creek Hatchery, British Columbia.
9/27/81	Lgth. Unknown 5.4 kg	2-16-15	1978	Robertson Creek Hatchery, British Columbia.
10/3/81	Lgth.-Weight Unknown	2-17-32	1978	Atnarko Hatchery, British Columbia.

1/ This individual was caught in an experimental shrimp trawl.

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